

Neuroscience in the teaching of English

Pedro Julio Mendez Aguilera^{1,}; Italo Rigoberto Carabajo Romero^{2,+}; Ketty Zoraida Vergara Mendoza^{3,++};*
 Universidad Agraria del Ecuador; Universidad Estatal Península de Santa Elena.
 {pmendez@uagraria.edu.ec; icarabajo@upse.edu.ec; kvergara@uagraria.edu.ec}

Fecha de recepción: 1 de Agosto de 2018 - **Fecha de revisión:** 21 de Agosto de 2018

Summary

This study seeks to give an approximation to the role of the use of neuroscience in the teaching of the English language, to create educational resources to a language with a communicative approach teaching and reflecting on the implementation of methodological strategies congruent to modern education, is made a revision to new contributions in the pedagogical field, which include neural studies to see more closely how it develops and mature central nervous system and the brain, so now that the emphasis on learning a foreign language has become popular in recent decades, arduous way seeks to methodological strategies and activities to enhance their learning, which in this study proposes the use of six teaching strategies based on knowledge of how the brain, which are a contribution to reduce the educational gap between the old and the new school.

I conducted this study is with teachers of English from the University of Agraria del Ecuador. The correlational descriptive method is used and as results were obtained that the relationship between the studied variables is positive.

Keywords — Neuroscience, brain, education, teaching, English, methodological strategies, constructivism.

INTRODUCTION

The main reason for writing this article has been the concern that in Ecuador of English teachers have a broader knowledge of how the brain of the apprentice and to create a learning environment in which students achieve communicate successfully in the target language.

The content in the first place seeks to relate the theses of the defenders of Constructivism as psychologists: Piaget, Vygotsky, Ausubel, and Bruner with Neuroscience, already in his time, they sought to understand the psychological sense of teaching, but the This paper seeks to go further by relating the psychological aspect of learning with the work of the brain as Ausubel says learning to take the character of significant.

To achieve this objective is needed as claimed (Jensen, 2000), quoted by (Salas Silva r., 2003), constituting a learning based on how the brain works, in a process founded on the information of the use of a group of practical strategies, based on specific

principles derived from brain research.

So that (Manx, s.f), says that with Neuroscience we can access not only of first but also of second language teaching programs, founded on the functional properties of the brain areas that have to do with language learning. Allowing you to search for quality and effectiveness in programs of teaching languages at different levels of education.

Therefore, in general, is intended to identify seven pedagogical techniques for teaching English, and as neuroscience brings to the development of the communicative competence in students of the Agrarian University of Ecuador.

THE CONTRIBUTION OF THE NEUROSCIENCE IN THE TEACHING OF A FOREIGN LANGUAGE

Through Neuroscience is has been able to determine that the human brain is characterized by complexity and unmatched skill, that Homo sapiens offers you the opportunity to teach and learn; it is, therefore, the result of the evolutionary history of man, according to (Battro, 2012).

Now you can study the brain with high technology resources such as brain imaging, genetic testing, and the computational simulations as they claim

*Licenciado en Ciencias de la Educación mención Ingles, Magister en Gerencia Educativa

+Licenciado en Ciencias de la Educación especialización: Lengua Inglesa y Lingüística, Magister en Docencia y Gerencia en Educación Superior.

++Licenciada en Ciencias de la Educación mención Lengua Inglesa y Lingüística, Magister en Diseño Curricular.

it (Willingham & Lloyd, 2007), by which a new generation of teachers should be prepared to lead the profound changes that will be achieved.

With respect to these discoveries, are considered to be three essential in current teaching shafts: the knowledge of the brain, human development, and education, which seeks to break paradigms and find how to learn the human brain; in such a way that the constructivism gives way to new hypotheses. (Ardila & Rosselli, 2007), cited to (Leiner et al., 1991, 1993), those who propose that the brain helps cognitive processing, and in particular the language processing via front cerebellar circuitry that is connected to the cortex prefrontal and Broca's area.

(Campos, 2010) , exhibits a great challenge of contemporary society is the training of qualified teachers, who are in charge of new and better environments of learning appropriate to achieve efficient teaching practices, curriculum, proposed in an emotionally positive environment in classrooms of schools, colleges, and universities.

The current knowledge of how the brain works has helped break with certain myths regarding learning, as that: adults already can not learn a language with ease that a teenager does, or that make you learn languages to a child is to oversaturate it; There are easier than other languages to learn, or that men are slower than girls for learning languages, as it claims (Tokuhamas-Espinosa, 2013).

On the contrary, says (Tokuhamas-Espinosa, 2013), that the learning of a language in a bilingual or multilingual child, sits in Broca's area. For this reason, an adult learning a new language not affected is, since it is this expertise in areas of the brain that a monolingual, not the USA, so not can sure what about load when learning another language.

The brain is a plastic body, you need to exercise. And even Noam Chomsky, mentioned by (Baron & Müller, 2014) affirms that all human beings are born with a device that facilitates the learning of sounds and grammatical rules of any language, this abstract mental device, Chomsky called it LAD (Language Acquisition Device), or language acquisition device.

Here is where comes the neuroscience, because according to (Tokuhamas-Espinosa, 2013), citing studies John Hattie (2009, 2012, 2013), who claim that the knowledge of how the brain works can lead to finding better ways to handle learning and achieve best educational practices in the teaching of languages.

NEUROSCIENCE AND EDUCATION

Are many factors to consider when learning a new language. The idea of developing a communicative approach should not be limited, only the use of educational strategies and methodologies, but also the understanding of natural processes that humans have developed to acquire new information and thus the Neuroscience has an important role in education. The relationship between neuroscience and education is not new, neuroscience has studied how humans learn for decades (Willingham & Lloyd, 2007), hence the term educational neuroscience.

Knowing how the brain works helps us to know according to (Norden, 2014), that "learning and memory occur over time and involve different individual events, for example, assisting, coding (learning), and recover (memory)".

(Bolland, 2016), ensures that there is a mismatch between the way of teaching and the way in which the brain learns, teachers are always the same, not innovate, not creating something new in each class; students must experience things that activate them, want to explore the world that it is teaching them. The educational system must be transformed, students need more customization.

Thus, an experienced teacher knows that the lessons are not generic, but that his role is to design methodological strategies that allow him to recognize the individualities, or specific needs of each student, based on what the learner already knows and what you need to learn.

Starting from constructivism, university education requires obtaining a new educational paradigm, in which it is intended to include the enrichment and internal deepening of the diverse individuals with their environment as it is referred to (P. de Aparicio, 2009). As Howard Gardner says; There are eight different ways of learning: linguistic, musical, visual, kinesthetic, logical-mathematical, naturalistic, interpersonal and intrapersonal intelligence.

The theory of multiple intelligences is closely related to neuroscience because through it we know that the individual is a being constituted by multiple capacities that interconnect and complement each other; "Hence its integral and holistic nature that allows us to explain human behavior from a more integrated perspective, we're thinking, feeling and acting are interpenetrated in a whole that influences the performance of the individual, both personally and at work, as professional and social ", as he states

(Velásquez Burgos, Calle M, & De Cleves, 2006).

With the use of multiple intelligences the individual is able to use to a large extent all their brain capacity, this aspect is what should be used by the language teacher to achieve the use of the three brains (rectal, limbic and neocortex), or triune brain, as they claim (Velásquez Burgos, Calle M, & De Cleves, 2006), based on the studies conducted by Sperry and Maclean, who affirm that the brain has three structures that are chemically and physically different and that are constituted by the following way.

Neocortical system, which is structured by the left hemisphere and the right hemisphere; the limbic system, which is located below the neocortex and is associated with the ability to feel and desire; and a third-R (reptilian) or basic system that is related to patterns of behavior, sense of belonging and territoriality, as well as to the system of beliefs and values that is received from the first formation. (Velásquez Burgos, Calle M, & De Cleves, 2006).

Other researchers affirm that the two cerebral hemispheres have different functions, while the left brain works analyzing logically, objectively, analytically, rationally, linguistically, coherently and in detail; the right brain, on the other hand, is memorized and details everything in a spatial, sensory, holistic, intuitive, synthetic, subjective and detailed way of everything that processes, being responsible therefore for enhancing aesthetics, creativity, and feelings. (Velásquez Burgos, Calle M, & De Cleves, 2006)

All individuals tend to develop one of the hemispheres in a greater way, but in the teaching of languages it is necessary to use the whole brain, for which techniques and learning strategies should be used to connect the two cerebral hemispheres, in order to optimize the experience of learning and build knowledge, so that knowledge of neuroscience allows for teacher improvement, so that the teacher bases learning strategies in the interest of the student. So to create a new pedagogy the teacher must understand how the brain works, to improve their ability to teach as well as the student's ability to learn. Being human development for education a great challenge; as stated by Velásquez, Calle M, De Cleves, 2006, mentioned by (Blanco Puentes, 2006). "The new pedagogy should start, in addition to the analysis of the role of the self-conscious mind, the interaction of the cognitive-affective system and the harmony between the three brains."

With which the authors refer to motivation, an aspect that for (Salas Silva, 2003) is of vital importance and who mentions one of the principles of brain learning citing (CAINE AND CAINE 1997)

Emotions are critical for the development of patterns: what we learn is influenced and organized by emotions and mental sets that imply expectations, inclinations and personal prejudices, self-esteem, and the need for social interaction. Emotions and thoughts are molded to one another and cannot be separated. Emotions give color to meaning. Metaphors are an example of this. Therefore, an appropriate emotional climate is essential for a healthy education.

With this it is deduced that when teaching must be stimulated in a multisensory way so that the student learns for life, it concludes (Lolín Ortiz, 2010), what is achieved when the teacher seeks to teach through an active form for the student to believe, that is, build your own learning trying to go beyond what the teacher provides, this requires taking into consideration the state of mind of the student, that the information is important for learning to become significant

Seven strategies based on neurosciences to develop effective language learning.

The well-prepared teacher

The good teacher is a coach who teaches with a positive attitude so that the student learns, gives him clues, uses the scaffolding, because he is attentive to the needs of his students, has the ability to encourage them to move forward, inspire them to be the protagonists Of your dreams. In such a way that the successful teacher, in bilingual environments expresses the same discourse even having different students, even some of them having gaps of knowledge in the different areas of the language such as syntax, vocabulary, grammar, phonology, etc. Achieving to create in all of them the same prospects of triumph.

Anxiety in the student is a negative aspect, in this respect Stephen Krashen, cited by (Pizarro & Josephy, 2010), proposed the affective filter hypothesis that maintains that the higher the effective filter, the more anxious, the less cooperation and self-esteem, and with this, a greater possibility of failure will occur in the student; on the contrary "a low affective filter will allow better levels of acquisition and learning of a second language"

An aspect of great importance is to gain the credibility of the student to what is known as the "social contagion" that "is based on a complex system

of neuronal mirror in the brain, by which people respond to the emotional states of others “According to what he says (Pineda, 2008), cited by (Tokuhamas-Espinosa, 2013).

In a safe, relaxed and supportive learning environment, the motivation of it will reach its climax; Since the student knows that he can express himself without the fear of being ridiculed, students will find ample opportunities to learn by supporting their learning efforts as he affirms (Thanasoulas, 2002).

ERROR AS A MEANS OF LEARNING

An environment must be created in which error is celebrated as a way to achieve learning outcomes. In this context according to (Guillen, 2012), the error is part of the learning process. It can not be seen as a failure. Do not generate fear of failure, but reinforce the expectations of success, when our brain feels that the activity to be performed is a pleasant situation puts the body in a pleasant situation. Since it secretes dopamine, which is what makes us like something.

It is necessary to mention the scaffolding theory of Vygotsky, so that through the intervention of an adult or a more capable person the student is helped to move from the zone of proximal development or ZPD, and the level of potential development, determined through the resolution of a problem under the guidance of an adult or in collaboration with another more capable companion “(Vigotsky, 1988: 133), cited by (Baquero, 1997).

An optimal language class is the one that seeks the learning and production of the language, through the support that the student receives to take risks in the production of it and in which error is seen as a natural part in the progression of language learning ; for which the teacher must establish a policy of correcting them that prohibit students from making fun of the mistakes of their peers.

THE PLAYFUL ASPECT OF LANGUAGE TEACHING

According to (De La Luz, 2011), in the current times the teaching of English must be framed around an active role of the learner and not in the imposition, the learning must be significant as they affirm (Ausubel) and (Froebel) As the author suggests, why not rely on the game?

(Baquero, 1997). Mention the game as a powerful ZPD mechanism; In this regard (Labrador Piquer &

Morote Magán, 2008), they conclude that “The game allows us to plan activities that take us beyond the domain of linguistic structures and that ELE students can use them to communicate in real situations”.

Since ancient Greece, the game has been considered one of the aspects that activate the creativity and spontaneity of the learner, this allows teachers to do the planning of the class attending to the individualities that it has in it.

The experienced teacher converts any type of activity into a playful type.

(Labrador Piquer & Morote Magán, 2008), recognize in the game its ease of introducing it at any moment of the educational process, it can play different functions, such as being the core of the activity, it can also serve for the presentation of a new content or it can be used as a complement to an activity, or the mechanism for reviewing structures already explained in the classroom.

REPETITION

In neuroscience it is known that in order for learning to become meaningful when the already known information is connected with the new one, so to make learning a more relevant activity the brain needs repetition; the memorization takes place after a series of automatisms as it affirms (Willingham, 2011), cited by (Guillen, 2012).

Thus, repetition is a natural mechanism and very effective, it could be considered that it is the best when you want to consolidate learning. For the information to be recorded permanently, the brain requires that the information is repeated several times.

In the teaching of English children learn through drillings, which is nothing more than the repetition of language structures over and over again through games, chants, and songs. In the same way the repetition is used with young people and adults, in this case, university through music and games in which it is required that the structures being studied are repeated again and again, of course unconsciously as part of the game, as for example in the chain game, Simon says, charades, among others.

(Bolland, 2016), states that the best way to encourage learning is in the use of spaced repetition, to update information that could have been forgotten, with repetition of information already studied the student remembers more information.

GROUP LEARNING

(Paulus, 2009) mentioned by (Velásquez Burgos, Calle M, & De Cleves, 2006), states that in general, the student wants to learn as a group since the brain is a social organ. which implies that you should choose strategies, in which the student should talk in a group, or use role-play, in which they should use the language spontaneously, the same happens when choosing activities such as Reading, for example, where you can use jigsaw learning to support cooperative learning. In this regard, it should also be mentioned that the use of dynamics such as icebreakers, and games to energize the learner when the level of motivation tends to fall, in which the teacher plays the role of the monitor are of utmost importance.

THE USE OF REALIA

The English class must be attractive, for which the teacher must use real materials in the class, what is known as realia, which is the practice of using real and visible objects in class to help students connect with the classroom. language at a different level.

With the real objects the teacher can make the class more memorable as he states (Méndez, 2015), mentioning Palmer 2010, who asserts that only our imagination can limit the use of reality; and even the grammar can be taught with realia as the author says, because if you are going to teach prices an excellent way to make them understand the structures is, bring clothes to the class, so that through a role play, students have an experience in which the teacher investigates prices and the use of the verb to be, is how he connects to the real world with the teaching of language and learning becomes significant, as he states (Haycraft, 1997), “that the more closely the teaching of a language this to real life, more interesting this will be.

It is so far (econo.unlp.edu.ar/, 2009), it is relevant to give “A learning based on direct experience or” first hand “that transcends the limited pedagogical capacity of a textbook or an oral class of the teacher.

THAT

ESA, is a sequence that the teacher should use in the class to keep students motivated and that they benefit the most from their learning experience, we know that learning is obtained when the heart and mind are activated through the participation in the class (Harmer, 2007), proposes the use of the sequence (Engagement, Study, Activation).

Engagement is the commitment that the teacher obtains from the student for the activity to be done in the class, Study is the stage in which the teacher includes the information to be taught, the student must be focused to build their language learning and Activate, is the moment in which the student will use what they have learned in a free and communicative way, without the teacher's correction, since what is required is for the student to focus on the message he wishes to express.

The sequence is not used once in the class but each activity must be confirmed with the sequence. As stated (Méndez, 2015), “if a student is motivated correctly (engagement), this will give their best effort to produce the target language (activate), without losing motivation when there is an explanation of the content to study or (Study)”

METHODS

The design of the research is of a descriptive and correlational type, by making a theoretical analysis of the use of neuroscience in education and how knowledge of how the brain works positively affects the increase of English teaching skills. In order to learn more about the degree of knowledge of the use of neuroscience in teaching English, a total of thirteen teachers in the English area of the Agrarian University of Ecuador were interviewed, who have ages ranging from 27 to 47 years old, three men and ten women. These data were collected between the months of September and October 2016, the same ones that were analyzed to organize the corresponding research report, in the application of the survey teachers were asked their voluntary collaboration to answer questions about the use of Neuroscience in his daily teaching in the classrooms of the University.

Hypothesis: The knowledge of how the student's brain works will help the English teacher to create strategies for the student to learn the language in a successful way.

DISCUSSION

In the present study, it is confirmed that the knowledge of how the student's brain works, will help the English teacher to create strategies for the student to learn the language in a successful way. More research reflects that the English teachers of the Agrarian University of Ecuador do not have a wide knowledge of how being aware of how the brain of the student works can help them achieve the development

of communicative skills of their students.

The teachers of English of the Agrarian University mostly identify with the communicative teaching approach or (COMMUNICATIVE LANGUAGE LEARNING), since 50% of them answered that they use this method; In second place is the use of the grammar-based method, with the 35% response of the total number of teachers and Cooperative Language Learning seems to be quite relegated in its use, because 15% of teachers say they use it. It should be noted that teachers mostly mentioned using 2 or more methods.

These results show that teachers know how important it is to develop the communication skills of their students and that the communicative approach with which the language is currently taught helps the development of the skills of the future speaker of the language, but a method or approach does not work in an isolated way whereby the teachers mention two or three methods to make the student speak; at the same time they claim to use the grammar-based method, which is not bad for the college program, but they make very little mention of the Cooperative Language Learning method, which is necessary to support the gregarious spirit of the human brain .

Regarding motivation, they respond that one of the ways to motivate them is to make the student understand how important it is that they learn to master a language for their future as a professional. Another group, but in smaller numbers, respond that they do it through exercises in virtual platforms, as well as the use of role-plays, exhibitions on innovative topics and listening exercises. In the same context, other teachers assert that motivation is given through the performance of grammar exercises combined with speaking activities.

To improve their ability to teach, as well as the student's ability to learn, is to say that to create a new pedagogy; the teacher must know how the brain works, being human development for education a great challenge; as they claim (Velásquez Burgos, Calle M, & De Cleves, 2006), when they assert that "the new pedagogy must start, in addition to the analysis of the role of the self-conscious mind, the interaction of the cognitive-affective system and the harmony between three brains. "

With which the authors refer to motivation as an aspect that stops (Salas Silva, 2003) is of vital importance and who mentions one of the principles of brain learning that is the motivation through the

handling of emotions, like these, they give color to the meaning. Therefore, an appropriate emotional climate is essential for a healthy education.

Another question was the use of Spanish in the English class; About which at least more than half, a total of 39% of respondents said that there is little interference that the use of Spanish produces in the student, who, it is assumed, would recommend the use of Spanish in the English class, while 38% of them affirm that the use of Spanish in the classroom is a factor that causes a considerable impact on the development of communicative skills in English. At the same time, 23% of the teachers surveyed say that the percentage of interference is very high.

Regarding the group work modality that they manage in the class, most teachers prefer the performance of speaking tasks through small groups; followed by work as a couple and finally with a percentage not far from individual work. On the contrary, only one of them claims to use the whole group. That is to say that the tendency reflects that if one seeks to work trying to take advantage of the gregarious spirit of the individual. The aspect that is mentioned by (Paulus, 2009), indicated by (Velásquez Burgos, Calle M, & De Cleves, 2006), by stating that in general, the student wants to learn as a group since the brain is a social organ. This knowledge of how the student learns becomes very important when planning the bilingual class.

Regarding the use of the proposed methodological strategies, 31% of teachers demonstrate using role plays, an activity in which the teacher is only a guide to student learning, as they claim. Another of the mentioned strategies is the use of realia, with 23%, since it is a strategy that facilitates the teaching of the subject, by taking materials that make learning an exciting experience, what they will remember, they also mention the use of the repetition with 19%, accompanied by drillings with 12%, mention using it in this case as a tool for the learning of their students. At the same time, there are teachers who mention the game as a strategy, at 15%, they mention using it to encourage the student.

In accordance with the use of the play factor in the English class, teachers assume that this is a factor that motivates the student to learn the language, with a percentage of 38% and 31 that consider that the game helps a lot and a lot respectively. On the contrary, some of the teachers, in a percentage of 31%, affirm that the play factor is of little help.

The group of proposed strategies supports the theory of multiple intelligences, which is closely related to neuroscience because through it we know that the individual is a being constituted by multiple capacities that interconnect and complement each other; "Hence its integral and holistic nature that allows us to explain human behavior from a more integrated perspective, where the thinking, the feeling, and the acting are interpenetrated in a whole that influences the performance of the individual, both personally and at work, as professional and social", as he states (Velásquez Burgos, Calle M, & De Cleves, 2006).

Regarding the question of whether they know how the use of neuroscience helps in the teaching of languages, most teachers mention that they have not had the experience of working with these types of strategies in the classroom, since 23%, while 23% of them do not know the existing relationship or in a certain way they know about the help that neuroscience can give to education in 23%. Likewise, 31% of teachers believe that knowledge of how the brain works would help them in their educational work, but at the same time they think that this knowledge is only captured on paper, but it is not taken to reality.

In the question that if you know about the use of neuroscience in education, the tendency of the previous answers is confirmed, since some of the teachers surveyed, in 31% demonstrate to know enough, on the contrary 69% of the teachers they say that there is little knowledge they have of how knowledge about neuroscience can help the teacher in the attempt to merge it with pedagogy, through knowledge of how the brain can offer a more meaningful teaching, accompanied by methods, techniques, and procedures that allow us to take advantage of the student's emotions and thus obtain their predisposition to learn; what corroborates what (Tokuhamu-Espinosa, 2013), mentioning the studies of John Hattie (2009, 2012, 2013), who affirms that knowledge of how the brain works can lead us to find better ways to direct learning and achieve the best educational practices in terms of language teaching.

Authors who also affirm that the use of the cerebral lobes in total synchrony can produce an optimal environment for learning the language since creativity is activated, which would be an anchor to promote the learning of the same

What university teachers must understand is

that education should include internal enrichment and internal deepening of individuals with their environment and this is achieved with the knowledge that the teacher must have of how the human brain works, and Remember that the relationship between neuroscience and education is not new, neuroscience has studied how humans learn for decades (Willingham & Lloyd, 2007), what is known as educational neuroscience.

CONCLUSION

In modern times, new teaching strategies are required, which must be designed according to how the brain learns. As (Bolland, 2016), he asserts there is a mismatch between the way of teaching and the way the brain learns, teachers always do the same, do not innovate, do not create something new in each class; students must experience things that activate them, they want to explore the world that is being taught to them. The education system must be transformed, the students need more personalization.

There should not be a gap between education and the constant avalanche of information that technology brings daily. It is necessary to prepare the learner to face a changing world, for this purpose educators must abandon the simple transmission of abstract concepts that are not applicable to their reality. At present it is required that the student learn to learn, a process that must be facilitated by the school, in the search of a series of skills that daily life poses, in the case of language teaching; The challenge is to develop communicative skills, for which the fact that the learner can develop socio-emotional intelligence should be taken advantage of, therefore the teacher must be prepared in the knowledge of how the brain works, to develop the appropriate strategies that will serve for the development of the planning of his class, with the end in mind that the student is an active protagonist in the art of learning the language, since it is learned by acting, which is facilitated if an emotionally positive climate is created, making of learning a pleasant activity, in such a way that the individual's brain allows him to improve, helps him to use creativity as a resource for learning; therefore, education should not be disconnected from neuroscience.

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